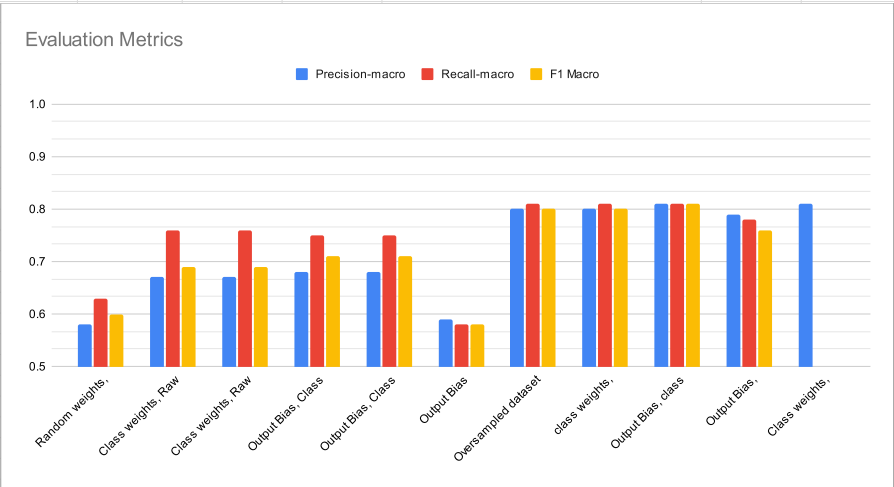| Run	Model	Training Acc.	Validation Acc.	Testing Acc.	Precision-macro	Precision-W	Recall-macro	Recall-W	F1 Micro	F1 Macro	F1 Weighted	Epoch	Note	
1	BERT	90	90	0.9	0.58	0.85	0.63	0.9	0.9	0.6	0.88	2	Random weights, Raw dataset	
2	BERT	81	83	0.83	0.67	0.9	0.76	0.83	0.83	0.69	0.86	2	Class weights, Raw dataset	
3	BERT	82	83	0.83	0.67	0.9	0.76	0.83	0.83	0.69	0.86	4	Class weights, Raw dataset	No change 2
4	BERT	80	85	0.86	0.68	0.89	0.75	0.86	0.86	0.71	0.87	2	Output Bias, Class weight, Raw dataset	
5	BERT	80	85	0.86	0.68	0.89	0.75	0.86	0.86	0.71	0.87	6	Output Bias, Class weight, Raw dataset	No change 4
6	BERT	89	89	0.89	0.59	0.84	0.58	0.89	0.89	0.58	0.86	2	Output Bias	
7	BERT	94	81	0.81	0.8	0.81	0.81	0.81	0.81	0.8	0.8	2	Oversampled dataset	
8	BERT	96	81	0.81	0.8	0.81	0.81	0.81	0.81	0.8	0.8	2	class weights, Oversampled dataset	No change 7
9	BERT	93	82	0.82	0.81	0.82	0.81	0.82	0.82	0.81	0.82	2	Output Bias, class weights, Oversampled dataset	
10	BERT	93	80	0.78	0.79	0.81	0.78	0.78	0.78	0.76	0.77	2	Output Bias, Oversampled dataset	
11	BERT	94	80	0.81	0.81	0.82	0.81	0.81	0.81	0.81	0.81	2	Class weights, Oversampled dataset	

Run	Class	TP	FP	FN	Precision	Recall	F1
	0	0	0	286	0	0	0
	1	3726	318	112	0.92	0.97	0.95
1	2	756	157	77	0.83	0.91	0.87
	0	166	590	120	0.22	0.58	0.58
	1	3249	110	589	0.97	0.85	0.9
2	2	699	143	134	0.83	0.84	0.83
	0	166	590	120	0.22	0.58	0.58
	1	3249	110	589	0.97	0.85	0.9
3	2	699	143	134	0.83	0.84	0.83
	0	138	356	148	0.28	0.48	0.35
	1	3389	160	449	0.95	0.88	0.92
4	2	739	175	94	0.81	0.89	0.85
	0	0	0	286	0	0	0
	1	3796	456	42	0.89	0.99	0.94
6	2	627	78	206	0.89	0.75	0.82
	0	3008	696	1568	0.81	0.66	0.73
	1	3272	1450	556	0.69	0.85	0.76
7	2	4524	462	474	0.91	0.91	0.91
	0	3168	675	1408	0.82	0.69	0.75
	1	3185	1224	653	0.72	0.83	0.77
9	2	4608	552	390	0.89	0.92	0.91
	0	2432	407	2144	0.86	0.53	0.66
	1	3497	2114	341	0.62	0.91	0.74
10	2	4476	486	552	0.9	0.9	0.9
	0	3104	660	1472	0.82	0.68	0.74
	1	3275	1414	563	0.7	0.85	0.77
11	2	4494	465	504	0.91	0.9	0.9

Run	Precision	Recall	F1
1	0	0	0
2	0.22	0.58	0.58
3	0.22	0.58	0.58
4	0.28	0.48	0.35
5	0.28	0.48	0.35
6	0	0	0
7	0.81	0.66	0.73
8	0.81	0.66	0.73
9	0.82	0.69	0.75
10	0.86	0.53	0.66

Evaluation Metrics

Metrics of Class 0

Run	Model	Training Acc.	Validation Acc.	Testing Acc.	Precision-macro	Precision-W	Recall-macro	Recall-W	F1 Micro	F1 Macro	F1 Weighted	Epoch	Note
1	BERT	90	90	90	0.58	0.85	0.63	0.9	0.9	0.6	0.88	2	Random weights, Raw dataset
6	BERT	89	89	89	0.59	0.84	0.62	0.89					
2	BERT	81	83	83	0.67	0.9	0.76	0.83					
4	BERT	80	85	86	0.68	0.89	0.75	0.86					
7	BERT	94	81	81	0.81	0.82	0.81	0.81					
10	BERT	93	80	78	0.79	0.81	0.78	0.78					
11	BERT	94	80	81	0.81	0.82	0.81	0.81					
9	BERT	93	82	82	0.81	0.82	0.81	0.82					

BERT Results

Run	Case	Class	TP	FP	FN	Precision	Recall	F1
		0	0	0	286	0	0	0
		1	3726	318	112	0.92	0.97	0.95
1	Random weights	2	756	157	77	0.83	0.91	0.87
		0	166	590	120	0.22	0.58	0.58
		1	3249	110	589	0.97	0.85	0.9
2	Output Bias, Raw	2	699	143	134	0.83	0.84	0.83
		0	0	0	286	0	0	0
		1	3796	456	42	0.89	0.99	0.94
6	Class weights, R	2	627	78	206	0.89	0.75	0.82
		0	138	356	148	0.28	0.48	0.35
		1	3389	160	449	0.95	0.88	0.92
4	Output Bias, Clas	2	739	175	94	0.81	0.89	0.85
		0	2976	610	1600	0.83	0.65	0.73
		1	3345	1456	493	0.7	0.87	0.77
7	Oversampled dat	2	4566	459	432	0.91	0.91	0.91
		0	2432	407	2144	0.86	0.53	0.66
		1	3497	2114	341	0.62	0.91	0.74
10	Output Bias, Ove	2	4476	486	552	0.9	0.9	0.9
		0	3104	660	1472	0.82	0.68	0.74
		1	3275	1414	563	0.7	0.85	0.77
11	Class weights, O	2	4494	465	504	0.91	0.9	0.9
		0	3168	675	1408	0.82	0.69	0.75
		1	3185	1224	653	0.72	0.83	0.77
9	Output Bias, Clas	2	4608	552	390	0.89	0.92	0.91

BERT Result

F1 Score of Each Class

Run	F1 - Hate	F1 - Offensive	F1 - Normal	Case
1	0	0.95	0.87	Random weights, Raw dataset
6	0	0.94	0.82	Output Bias, Raw dataset
2	0.58	0.9	0.83	Class weights, Raw dataset
4	0.35	0.92	0.85	Output Bias, Class weight, Raw dataset
7	0.73	0.77	0.91	Oversampled dataset
10	0.66	0.74	0.9	Output Bias, Oversampled dataset
11	0.74	0.77	0.9	Class weights, Oversampled dataset
9	0.75	0.77	0.91	Output Bias, Class weights, Oversampled dataset

BERT Result

Validation Acc. and Testing Acc.

Run	Model	Training Acc.	Validation Acc.	Testing Acc.	Precision-macro	Precision-W	Recall-macro	Recall-W	F1 Micro	F1 Macro	F1 Weighted	Epoch	Note
1	CNN	86	87	85	0.56	0.8	0.52	0.85	0.85	0.53	0.82	5	Random weights, Raw dataset
2	CNN	88	87	85	0.8	0.85	0.51	0.86	0.86	0.54	0.82	15	Output Bias, Raw dataset
3	CNN	72	71	70	0.58	0.86	0.73	0.7	0.7	0.59	0.75	20	Class weights, Raw dataset
4	CNN	84	77	77	0.62	0.87	0.74	0.78	0.78	0.64	0.81	40	Output Bias, Class weight, Raw dataset
5	CNN	93	83	66	0.66	0.68	0.66	0.59	0.59	0.66	0.59	20	Oversampled dataset
6	CNN	84	82	59	0.7	0.72	0.64	0.62	0.62	0.62	0.62	2	Ou
7	CNN	87	86	67	0.68	0.69	0.67	0.67	0.67	0.67	0.67	2	Cla
8	CNN	80	80	62	0.68	0.65	0.64	0.63	0.61	0.63	0.65	2	Ou

Case	BERT F1 Micro	CNN F1 Micro
Random weights	0.9	0.85
Output Bias, Ra	0.91	0.86
Class weights, R	0.83	0.7
Output Bias, Cla	0.86	0.78
Oversampled da	0.81	0.59
Output Bias, Ov	0.78	0.62
Class weights, O	0.81	0.67
Output Bias, Cla	0.82	0.61

CNN Results

BERT F1-Micro & CNN F1-Micro